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RESIDUAL WOOD AFTER LOGGING IN THE WESTERN WHITE PINE REGION

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Woods Waste Survey

RESIDUAL WOOD AFTER LOGGING

in the

Western White Pine Region.

An Inventory Classification and Analysis of Unused Wood Left on Logged-Over Areas.

By

I. V. Anderson
Section of Forest Products

January, 1932

FOREWORD

The lumbermen of the United States have never been able to utilize 100 per cent of their raw material. However, they are not alone in this respect. The mining, petroleum, paper and other industries dependent upon natural resources for their raw material have numerous unprofitable by-products. The lumbermen also know that certain portions of their raw material (trees) are unfitted and unprofitable for lumber manufacture. Consequently, a certain portion of the tree is left as waste wood after a logging operation.

Not all wasting of wood is profitable. Excessive logging and mill losses of merchantable wood material can entirely wipe out profits. Likewise, unusable wood for which no profitable market exists will decrease an operator's margin for profit if handled, but will not materially affect it if left in the woods. This class of material will be referred to in this article as nonmerchantable waste, while wasted wood that yields a merchantable product suitable for lumber production as determined by prevailing utilization practices will be termed merchantable. Thus, all merchantable waste can not be considered as profit-bearing.

The term "waste" as used throughout this article in no way implies a wanton destruction of wood material, nor does the writer wish to convey the impression that all wood losses in logging white pine are avoidable, under average

economic conditions.

Merchantable waste in the western white pine region of the West is held to a minimum. Nevertheless, it is important. During the normal year approximately 24,040 acres of the white pine type is cut over in eastern Washington, north Idaho and western Montana. Twenty thousand (20,000) acres of this area are under private ownership, while the remaining 4040 acres are under State or Federal ownership. These 24,040 acres of forest cut over annually produce °424 million feet of western (Idaho) white pine sawlogs which are manufactured into white pine lumber valued at 18 millions of dollars.

It is estimated that since 1870 seven and one-half billion feet of western white pine logs have been cut. These have produced lumber valued at $265,800,000. Until recently the annual amount of unutilized wood in the white pine type has been only a guess. Investigation has shown a tremendous wood waste from logging in the Douglas fir region of the Pacific Coast. (1) Recent studies in that region disclose

° Scribner decimal C log scale, which is the U.S. Forest Service standard rule, is implied throughout this article wherever a reference is made to log scale.

(1) Study by Allen H. Hodgson, Office of Forest Products, Forest Service, Portland, Oregon, and published in the West Coast Lumberman.

an annual wood waste in logging of over 3 billion feet log scale of which approximately 1½ billion feet is contained in small sawlog sizes. This fact has caused the lumbermen of that region to consider ways and means of waste reduction.

These studies disclosed the information that the wood material left in the woods after logging resulted in great part from the methods and equipment used. The trees of the Douglas fir region are big. Logging equipment and methods have been developed to handle logs of large size and weight. Consequently, small logs cannot be handled economically with this type of equipment and are most often left in the woods. While the total merchantable and nonmerchantable waste per acre in the white pine type is only one-third as great as in the Douglas fir region, the amount of waste in proportion to the volume logged per acre is practically the same. The importance of a woods waste survey to the white pine operator is apparent. A total annual lumber production of 510 million feet valued at 18 million dollars indicates the potential value of even the slightest waste elimination. The lumberman should know what his footage and money losses are in excessively high stumps, broken and shattered logs, merchantable tops, etc. He should know to what stump height his lumber can be most economically cut. He should also know how his utilization compares with the average operation, and if it has fallen down, where, and in what way.

The above are problems of the present. What about

the future? There is much talk of the economic necessity of the integration of the lumber industry and other wood consuming industries. Before this can be considered the operator must look to his source of supply. How much wood will be available for pulp wood, miscellaneous wood working machines, etc. Combined regional logging and sawmill waste studies have made this information available.

This report has been prepared to present the results of a survey of the wood material left after logging in the white pine type of the Inland Empire Region. No attempt will be made to analyze the cause of the several losses or to present practical ways or means for their reduction. The survey covered other of the important timber types within the region and the results of the studies are contained in separate reports. Certain detailed studies have been, or are being made covering the wood losses incident to certain phases of the logging operation. These include studies such as breakage loss in felling, economical stump heights, bucking logs for grade and size of lumber, long-butting, etc. Results of the breakage loss in felling study are now available.

CONCLUSIONS OF THE STUDY

1. Utilization in both the woods and sawmills of the western white pine belt is undoubtedly of the highest standard west of the Rocky Mountains.

2. Ninety-two (92) per cent of the average western white pine tree logged in north Idaho is cut into sawlogs. Thus, only 8% of the tree is not utilized in the woods compared to 12% of the tree not utilized in the sawmill.

3. The unutilized wood of small sawlog size on the average acre logged in the white pine type amounts to 815 feet net log scale per acre of all species.

4. The unutilized wood of small sawlog size on the average acre logged in the Douglas fir region of the North Pacific Coast amounts to 10,660 feet b.m. This volume is sound and comparable in size to material skidded for sawlogs in the white pine region. Thus, there is approximately 13 times as much wasted sawlog material in the Douglas fir region as in the western white pine region.

5. The annual cut of western white pine in the Inland Empire is 424 million feet net log scale for the normal year. For every 1,000 feet (net) of white pine logged 35 feet (net) of merchantable white pine sawlog material is unutilized. This makes a total annual merchantable loss of approximately 15 million feet for the region.

6. The annual cut of all species in the western white pine type of the Inland Empire is approximately 603 million feet net log scale. For every 1,000 feet of all species logged 49 feet of merchantable material of all species is unutilized or unused. This makes a total annual merchantable loss of approximately 30 million feet (29,547 M).

7. For the average acre logged in the western white pine type during 1927 and 1928 there was a merchantable loss of 620 board feet net log scale of western white pine per acre.

8. This 620 feet of merchantable material was distributed, 402 feet to logs overlocked in skidding or left in tops, 231 feet to waste in stumps (excessively high stumps 50% or more sound) and 2 feet to merchantable dead material overlooked in logging.

9. The scale of the average white pine log overlooked in skidding or left in tops was 25 board feet. An average of 16 such logs per acre was found distributed as follows:

top logs	11.7
middle logs	3.5
butt logs	.8

10. The annual cut of western white pine sawlogs in the Inland Empire is 424 million feet (net) for the normal year. For every 1,000 feet b.m. net log scale of white pine logged 25 cubic feet (theoretically equivalent to 150 board feet) of nonmerchantable white pine wood is unutilized. This makes a total annual nonmerchantable white pine wood loss for the region of approximately 10 million cubic feet.

11. The annual cut of all species in the western white pine type of the Inland Empire is approximately 603 million feet net log scale. For every 1,000 feet b.m. (net) of all species logged, 44 cubic feet of nonmerchantable wood of all species is unutilized. This makes a total annual

nonmerchantable waste for the region of approximately 26½ million cubic feet.

12. The combined merchantable and nonmerchantable losses of all species logged in the white pine type amounts to 31½ million cubic feet annually of which only 5 million cubic feet (30 million feet board measure) is large enough to measure on a log scale b.m. basis.

13. The study indicated a nonmerchantable wood loss of 447 cubic feet of white pine on the average acre of the western white pine type after logging. This was composed of loose sound wood material on the ground of a minimum dimension of 4 feet long and a middle diameter of 4 inches outside the bark.

14. The study indicated a nonmerchantable wood loss of 1117 cubic feet of all species on the average acre of the western white pine type after logging. This was composed of loose sound wood material on the ground of a minimum dimension of 4 feet long and a middle diameter of 4 inches outside the bark.

15. This 1117 cubic feet of all species is distributed (1) 216 cubic feet (2.4 cords) of white pine cordwood on the ground. (2) 231 cubic feet (2.6 cords) of white pine cordwood in dead standing trees. (3) 111 cubic feet (1.2 cords) of other species suitable for cordwood loose on the ground. (4) 357 cubic feet (3.9 cords) of other species suitable for cordwood in dead standing trees. (5) 123 cubic feet (1.4

cords) of sound material of white fir, hemlock and spruce suitable for pulping purposes. (6) 79 cubic feet (.9 cords) of sound cedar suitable for split or round posts and short poles.

16. The average white pine stump height on all areas studied was 14.5 inches.

17. The average white pine stump on Forest Service areas studied was 11.7 inches in height.

18. The average white pine stump on private areas studied was 17 inches in height.

19. The lowest average stump height for a white pine operator was 8.8 inches. This was on a Forest Service sale area.

20. The highest average stump height for a white pine operation was 20.2 inches and was found on a privately owned area.

21. For every 1,000 feet of white pine logged in the western white pine type 12 feet of high class merchantable material is lost in high stumps.

22. One large operator cutting in an especially sound tract of western white pine lost 17 feet in high stumps per 1,000 feet (net) logged. His white pine stumps averaged 19.4 inches in height and ran 35 per acre on that portion of the area cruised.

23. This same operator left 841 feet per acre of merchantable material on the ground in high stumps, unskidded

logs and merchantable tops, or 40 feet for every 1,000 feet (net) logged.

24. The best utilization was found on a Forest Service sale area. A total of 21,210 feet (net) of white pine per acre was logged. There was a total merchantable waste of only 11 feet of white pine per thousand feet logged. Stumps averaged 8.8 inches in height.

25. Utilization standards as found by the study vary greatly between different camps of the same company. Sound stump heights sometimes differing as much as 9 inches on the average between camps.

26. One white pine area studied from which the cedar poles had been cut out cruised from 200 to 250 good cedar posts (split and round) per acre from cedar pole butts, tops, etc. The white pine trees were 250 years old.

27. A typical white pine logged-over area running heavy to larch contained 10 long butts of larch and 12 stumps of larch per acre. These long butts and stumps above the ground line will yield 220 (2½ cords) cubic feet of wood rich in galactan.

28. Elimination of excessive stump waste, excessive breakage, careless log bucking, etc., can be accomplished only by giving each operation the necessary supervision.

29. Well directed supervision by saw bosses will result in better logs and less loss of usable wood material. The average saw boss possesses too much sawyer psychology,

i.e., indifference to careless felling, careless long length measurement and high stumps.

30. The average saw crew and skidding unit receives less direct supervision than laborers of similar mental and physical ability in other industries.

STUDY METHODS AND MATERIAL INVOLVED

The study was made during the summer of 1928, from May 1 to September 1. The cruising was confined to 21 camps on the holdings of 10 companies cutting western white pine as their main species. A total of 432 one-fifth acre plots or 86.4 acres was tallied during the study. The operations of these 10 companies are quite uniformly scattered in the white pine belt from the North Fork of the Clearwater River in Idaho northward to the Canadian boundary. They extend westward to approximately 10 miles west of the Clark Fork River in Pend Oreille County, Washington, and eastward from the Panhandle of Idaho into western Montana, up the Clark Fork and Kootenai valleys about 20 miles. A two-man crew was used. Both men worked together during the first camp studied with one man acting as a tallyman. During the balance of the study both men worked separately as one-man cruising units.

The mechanics of the inventory were as follows. Upon arrival at a camp all recently logged areas were inspected and a portion selected for the cruise which was representative

of general camp conditions. Under the one-man crew system the man acted as both compassman and cruiser. One-fifth (1/5) acre plots were always established on a mechanical basis, i.e., if a plot interval of 5 chains was used at the beginning of a strip it was used the entire length of the strip. However, the course of individual strips was sometimes varied to secure the most representative route, through the cut-over area. On two of the largest white pine operations one-fifth acre plots were established at 5-chain intervals on strips 10 chains apart. The strips were run in cardinal directions. For most of the rest of the camps the course of strips was run similar to extensive cruise strips in a given drainage. The course of each strip was recorded and plotted in order to show the location of the strip in relation to the entire logged-over area. For those areas where a 5-chain plot interval was used the procedure was as follows:

Assuming that the average man takes 62 double paces per tally (5 chains), the cruiser stepped off 62 paces from the point of beginning. His compass staff was usually used as a plot center. On some areas an 8 or 10-foot pole with a white flag on the end was necessary because of the heavy slashings. He then paced 10 double paces in 4 directions and established stakes as plot boundaries. Next, all down material was recorded by quadrants, after which all standing material was estimated. About 50% of the standing

material 8" d.b.h. and over was taped. A Scribner decimal C scale rule was used for measuring stump dimensions and other down material. The following classes of material were measured.

SAWLOGS. Minimum size specifications for a piece of material tallied in this group was 8 feet in length and 6 inches in diameter, small end for white pine and 10 feet in length with an 8-inch small end diameter for other species. Logs overlooked in skidding and contained in smooth and straigh tops not bucked by the sawyers were listed under net scale unless the percentage of defect was greater than 75% for white pine and spruce and 50% for other species. In the case of cull logs, the entire log scale was recorded under defective logs. Woods cull per cent was computed from the defect scale. Coarse, knotty tops were excluded from this class regardless of size.

CORDWOOD. The minimum size of a piece of material recorded under this class was 4 feet in length by 4 inches middle diameter outside the bark. Any species was included unless it was a pulpwood species or suitable for posts, poles, etc. Most of the breakage in tops in other than the three pulp species fell in this class. Any sound dead down material suitable for fuel wood was also included.

PULPWOOD. The minimum size of a piece of material was four feet in length by four inches middle diameter outside the bark. Only hemlock, white fir, alpine fir and spruce were considered as pulp species.

POLES AND PILING. All material entered in this caption conformed to the Western Red Cedar Association specifications.

CEDAR POSTS. Included material suitable for split or round stuff - split stuff 6½ to 7 feet long and not less than a 4-inch top for 6½-foot posts and not less than a 5-inch top for 7-foot posts. Round stuff was not tallied under 6½ feet in length, 4-inch top nor over 12 feet in length with a minimum 5-inch top.

STUMPS. Stump heights were measured on the side adjacent to the nearest ground. No stump waste was computed for excessive stump heights if the surface area of the stump was 50% or more defective. Nor was waste credited to stumps cut high because of physical interference. No arbitrary minimum stump height was assumed. Suppose a stump was cut 16 inches in height. Upon consideration of its size (diameter), location and soundness, it was determined that a 6-inch stump would have been practicable. Then a section of the stump 10 inches in length was considered as loss.

The stump diameter inside the bark for each stump was recorded. Tree height tables based on tree measurements of down timber on areas adjacent to the study area were made for each operation studied. Volumes were computed by converting stump diameter measurements to diameter breast high and applying standard regional volume tables. Tables showing the relationship between stump diameter inside the bark and diameter breast high were also prepared.

DEAD TREES. All snags of any species suitable for fuel wood were tallied as such and their cubic contents recorded. Unsound snags were merely counted. Cedar snags containing sound post material were recorded as such.

LIVE UNCUT TREES. All species were estimated to 8 inches d.b.h., using a diameter tape for about 50% of the measurements. Trees found in a thrifty and apparently sound condition were classed as seed trees while others not damaged in logging or defective were classified as "other sound". An attempt was made to determine the defect per cent of each defective tree at the time it was recorded.

REPRODUCTION. Only those young trees of all species visible from the center of the plot or counted while tallying stumps and down material were recorded.

MERCHANTABLE WASTE SMALL

The white pine logger leaves very little avoidable merchantable waste in the woods. Nevertheless, the aggregate volume for the whole region is considerable. Logs overlooked in skidding and straight smooth and sound top logs not bucked by the sawyers are one source of merchantable waste. On the average there is a loss of 402 feet of white pine per acre of this class of material for the entire white pine region. A trifle over 24,000 acres are logged annually in the white pine region. With an average loss of 402 feet of white pine per acre the regional loss of usable logs overlooked in

skidding, etc., amounts to approximately 10 million feet of white pine, annually. Even though this volume was classed as logs usable for lumber production only a small percentage of them could be profitably converted into lumber even under normal business conditions.

WINTER SKIDDING with snow on the ground causes most of this loss. One operator was observed who "reared" his areas skidded under deep snow conditions. It is doubtful if this second skidding operation pays because of the scattered and uneven distribution of the logs. The scale of the average white pine log overlooked in skidding unintentionally or otherwise and in unbucked tops was 25 feet. A total of 16 white pine logs per acre was tallied as merchantable waste. Of this number 11.7 were top logs, 3.5 middle logs, and .8 butt logs. °Supplemental Table 1, part 1, also gives these data for associate species of white pine with the exception of spruce, cedar and lodgepole pine. However, the caption "all" contains data on these three species also.

URGE OR LACK OF URGE for close utilization is the most important factor affecting the amount of merchantable sawlogs remaining on the ground after logging. During the study one area was cruised where the operator contracted logging from stump to car at a piece price per log. Naturally, there is as much urge for a jammer crew to load a log

° Supplemental tables referred to throughout this report may be obtained from the Director, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana.

containing only 5 feet as there is to load a 500-foot log. In fact, more so because the hookers can throw the small log that scales 5 feet up to the top loader. Supplemental Table 2, column 1, company 3-21, shows how this system of contract logging affects the amount of merchantable material left in the woods. Only 4.7 white pine logs per acre contrasted to the average of 16 white pine logs per acre were left on this area. The total scale of these logs was 91 feet and 4 out of 4.7 of them were top logs. The degree of utilization between different operators in the white pine belt varies considerably. This fact is shown by referring again to Table 2, which shows a spread of from 91 to 516 board feet in white pine logs per acre overlooked in skidding, etc.

AGE OF THE STAND and skidding distance are other factors affecting the amount of merchantable sawlogs remaining on the ground. Age, as reflected in size, is probably more important than skidding distance. A great many more pieces must be moved per acre in young timber, consequently the possibilities of overlooked logs are greater. The dropping off in scale of merchantable logs overlooked in skidding is not so noticeable with an increase in age of the stand as the decrease in the numbers of logs left. The study shows that a total of 26.8 white pine logs per acre are overlooked in skidding, etc., in the 80-100 age class. This drops to 5.5 white pine logs per acre in the 200+ age class.

THE FOREST SERVICE has always urged and required close utilization on especially its sales of white pine timber. This is not merely for the sake of removing all usable wood material from the area, but as an aid in the practice of good silviculture. Supplemental Table 3, part 1, columns 4, 5, 6, 7, 8, 9, and 10, shows how the quantity of merchantable sawlog waste varies on private and Forest Service areas. In the 80 to 100-year age class this type of waste is practically the same for the two kinds of operations - 500 board feet of usable white pine left per acre on Forest Service areas as against 501 board feet of white pine on private areas. In the 141 to 160 age class the Forest Service areas showed 252 board feet of usable white pine per acre, while there were 502 board feet of usable white pine per acre on private areas. This is a larger loss on private areas. However, the table shows the reverse to be true in the 161 to 180-year age class. In this age class there were 723 board feet of usable white pine sawlogs left per acre on Forest Service areas compared to 337 board feet of the same class of material left per acre on private areas. This indicates that age class and ownership of land are not the most important factors affecting the amounts of merchantable sawlog waste after logging. It merely emphasizes what has been said previously. Close utilization is almost entirely dependent upon the intensity of supervision given this phase of the operation from the general manager down to the sawboss.

WESTERN RED CEDAR is one of the most common associates of white pine. At the present time it is utilized mainly for poles and piling with only a few split and round posts being manufactured. Table B gives some interesting figures of merchantable waste occurring on a typical cedar pole chance. It shows a total loss of 158 feet of merchantable white pine logs overlooked in skidding, etc. The timber was 250 years old and quite decadent, which accounts in part for the small merchantable waste per acre. This area cruised after logging 72 linear feet of poles and piling per acre, which were merchantable under the Western Red Cedar Association rules (in lengths of 30 feet and over).

EXCESSIVE STUMP HEIGHTS are the source of some loss in the white pine type to-day. The study showed a loss, because of high stumps, of 216 feet of high class white pine material per acre on the average western white pine operation. Stump waste was not computed on stumps showing 50% or more of their surface area to be defective or on stumps cut high because of physical obstacles. In no case did the cruiser compute waste below a stump height of six inches except on unusually sound white pine timber located on slopes in excess of 25%. On sidehill areas it was observed that sawyers had, of their own accord, cut stumps from 2 to 6 inches in height, indicating that it is not at all unreasonable to ask a sawyer to cut a 6-inch stump on sloping ground. It is believed that practically all of this 216 feet of wood

material lost in stumps is avoidable and from a value standpoint is more valuable than a like amount of top material. In computing stump waste on an excessively high stump the cruiser placed his scale stick alongside the stump in an upright position resting it on the nearest ground. He first read off the actual stump height and then from the same set-up of the stick read off a reasonable stump height for the stump. The difference between the two readings was then the length of the stump section lost. This stump section was then scaled as a fraction of a 16-foot log. For example, a wasted stump section 16 inches in diameter inside the bark and 6 inches long would scale (6 ÷ 196) or .0306 times 160 feet or 4.9 feet. The diameter of the wasted stump section is usually from 1 to 3 inches larger than the end diameter of the butt log. Some readers might feel that the waste in the stump section should be based upon an end diameter equal to the small end diameter of the butt log. This is not entirely consistent because a lower stump also conserves material farther up in the tree. It all depends upon which portion of the tree is credited with the saving as to whether or not the above method of stump waste computation is correct. The writer assumed that a saving made by cutting a lower stump could be credited to any portion of the butt log. Theoretically then the top diameter of the butt log should be used in computing the waste in a stump section. There were no data available making a computation of this character possible so the stump waste volumes per acre were reduced by 10% to offset this inconsistency.

The amount logged per acre on each acre cruised was computed from the stump measurements. Before stump diameter could be converted to tree diameters at breast height, it was necessary to compile a table converting stump diameter inside the bark to diameter breast high. There follows a table of this type for western white pine. The average sound white pine stump height cruised in 1928 was 14.5 inches. The average height defective white pine stump was 14.6 inches. Thus, sawyers apparently make no more effort to cut sound stumps low than they do defective stumps. The prevailing opinion among logging foremen and woods superintendents is this: If it were left to the sawyers to judge which stumps were sound and should be cut low, too many unnecessarily high stumps would be attributed to mistaken judgment. Under the proper supervision it is felt that badly defective stumps could be cut high and long-butted.

Stump DIB inches	For D.B.H. deduct inches
10	1
11	
12	
13	
14	
15	2
16	
17	
18	
19	
20	3
21	
22	
23	
24	
25	
26	
27	
28	
29	4
30	
31	
32	
33	3 or according to shape of each stump.
34	

STUMP HEIGHTS VARY considerably between operations. Supplemental Table 2, column 18, shows a range of average white pine stump heights from 8.8 inches to 19.4 inches. Not much uniformity. Surely there must be a proper stump height for both sound and defective white pine trees

that could be used as a guide for sawyers. At the present time the average private white pine operator instructs his sawyers not to cut white pine and spruce stumps over 16 inches in height. Supplemental Table 2, column 18, indicates how nearly this objective is attained. Operator 4-2, 3, column 1, aimed at 16-inch white pine stumps and averaged 19.4 inches with very lax supervision of utilization. Company 2, column 1, required 16-inch stumps and the average white pine stump height for four of their camps was 16.9 inches. This company has good woods supervision. The fact that they specify a maximum allowable stump height of 16 inches and only exceed that by .9 inch, indicates that they have pretty good control over stump heights.

THE FOREST SERVICE specifies a maximum allowable white pine stump height of 14 inches. The study indicated that this standard is usually attained in sales administration. Three of the four age classes studied on Forest Service sale areas contained white pine stumps averaging 10 and 12 inches in height. The fact that operators on private as well as Forest Service operations can control maximum stump heights so successfully is encouraging from a utilization standpoint. A recent study on a yellow pine area cut over 40 years ago indicated an average pine stump height of 30 inches. Stumps have come down since then about 14 inches on the average with a substantial saving of high class material to the operator.

NONMERCHANTABLE WOOD LOSSES

THE REGIONAL AVERAGE amount of nonmerchantable wood waste left after logging is not excessive. Supplemental Table 1, parts 1 and 2, show the classification and variation in amounts by age classes of the nonmerchantable waste in columns 14, 15 and 33. Two hundred and sixteen (216) cubic feet of white pine cordwood per acre were cruised as loose material on the ground after logging and 231 cubic feet of white pine cordwood were cruised in dead standing trees per acre. A total of 447 (column 49) cubic feet of white pine material. All species are itemized as 327 cubic feet (column 14), 123 cubic feet (column 15), 74 cubic feet (column 23), and 593 cubic feet (column 36), which equals 1117 cubic feet (column 49). This amount is equivalent to about 12 cords of wood per acre, of which only 1.4 cords are classed as pulp material. Entirely too small an amount per acre to be salvaged under existing economic conditions. These 12.4 cords of wood material can be segregated as follows: 3.6 cords of green and dead material loose on the ground, 1.4 cords of green pulpwood species, 6.6 cords of dead standing material, and .8 cord of cedar material suitable for posts or short poles and piling.

AMOUNT OF NONMERCHANTABLE wood losses vary considerably between companies. Supplemental Table 2, column 10, shows a loss of white pine tree wood from 47 cubic feet

to 298 cubic feet per acre. This tree wood is composed of only green and dead wood loose on the ground. Column 11 is comprised of a small amount of limb wood and other miscellaneous material. This table also shows the species distribution of the nonmerchantable waste.

WESTERN RED CEDAR losses are probably the most important nonmerchantable waste wood next to white pine. Table B shows that 552 linear feet of pole and piling material per acre are wasted for minor defects in long butts and tops. A portion of this waste was also incurred in cutting pole lengths to comply with current market demand. The demand for poles other than 35's or 40's varies considerably from time to time. Frequently, cedar trees that would make standard 50's or 55's are cut back to 45's in order to supply the market demand. A further loss of 242 round and split cedar posts per acre were cruised on this particular cedar chance. This would have been increased to approximately 350 round and split posts per acre had an effort been made by the pole makers to cut long butts in lengths ($6\frac{1}{2}$ feet) suitable for split posts where practicable. Of course, this practice would not be desirable unless there were at least a remote possibility that the residual cedar post material could be utilized by ranchers or loggers at a later date.

WHERE LARCH IS LOGGED in the white pine region it is usually long-butted from 2 to 8 feet in length. This is done to remove material unfit for lumber. There are numerous

white pine stands where larch is second in importance to white pine in volume as well as quality. A typical area of this classification cruised in north Idaho in 1928 showed a gross volume removed per acre of 13,400 feet white pine, 7,100 feet larch, 3,100 feet white fir, 1,500 feet Douglas fir, 1,200 feet cedar, 400 feet spruce, and 200 feet lodgepole pine. Larch wood, particularly that contained in butts and stumps, is rich in galactan. Galactan is a substance used in the manufacture of mucic acid and which in turn is used in effervescent drinks and pharmaceutical preparations. When subjected to destructive distillation, larch wood yields 33 gallons of ethyl alcohol per ton of dry wood, which is an especially high yield. Since practically every larch tree has to be long-butted there is no incentive to cut low stumps. Larch stumps on this area averaged 30.4 inches in height and contained 4.3 cubic feet of wood rich in extractives. There were 12 stumps and 10 long butts per acre. The long butts averaged 6½ feet in length and contained an average volume of 17.8 cubic feet of wood exclusive of bark. A summary of unusable larch wood per acre on this area shows 170 cubic feet of long butts and 50 cubic feet of available stump material sound except for shake and check defects. This amounts to 2½ cords.

RESIDUAL STANDS AFTER LOGGING

All live uncut trees 8 inches and over in d.b.h. were recorded in the survey. The average white pine tree remaining after logging in the white pine region in 1928 was 10.2 inches in diameter breast high. The average acre contained 7.9 white pine trees of this average diameter (10.2 inches) containing a net volume of 1,060 feet (Table A, column 16). The average diameter of all trees remaining after logging in 1928 was 14.5 inches (Table A, column 9) and ran 46 per acre containing a net volume of 7,460 feet (Table A, column 16) and a gross volume of 10,640 feet. Dead standing trees or snags are quite numerous on white pine logged-over areas. The cruise showed a regional average of 3.5 white pine snags and a total of 14 snags of all species per acre. Practically every one of these snags is a potential source of danger and trouble in fire suppression work. Residual stands will vary from year to year as cutting practices on private lands are modified and as the percentage of Forest Service operations vary. Supplemental Table 1, part 2, columns 39 to 48, which may be obtained by request from the writer, shows only residual stand conditions as they existed in 1928. Supplemental Table 2, columns 22 to 32, shows how these same residual stands varied at different camps. There is not much variation between camps in the size of the average white pine tree left uncut. The smallest average diameter was 9.2 inches and

the largest 12.7 inches. There is, however, a much greater variation in the number of white pine trees remaining per acre. This varies from .4 of a tree to 22.4 white pine trees per acre. Cutting practices varied widely in 1928 for mixed timber. Some operators practiced clean cutting of all species of timber on the area while others cut only white pine. This caused a wide spread in the average diameter of the average residual mixed tree as well as in the number remaining per acre. Columns 31 and 32 of this same table indicate the amount of defect existing in residual stands. Company designated as 2-3 (column 1) was a typical example of an overmature decadent white pine stand where very little of the mixed timber was sound enough for utilization. There remained on this area a total of 9,200 feet (column 31) of white fir per acre having a net scale of only 3,400 feet - all cull.

THE FOREST SERVICE PRACTICES selective cutting on all white pine areas. Supplemental Table 4 shows a comparison of private and Forest Service residual stands in 1928. This table is not representative of conditions on privately logged areas as they exist to-day. At about the time the cruise was made the Clearwater Timber Company, the largest operator in the region, started selective cutting very similar to Forest Service practice. This fact will materially increase the volume of white pine left on the average acre of privately owned logging areas. In 1928 there remained on Forest

Service sales in the 80 to 100-year age class a volume of 3,710 feet of white pine per acre compared to 960 feet on private areas. This volume was contained in 36 and 18 trees, respectively. The total volume of residual stand per acre remaining on Forest Service areas in the 80 to 100-year age class was 8,410 feet contained in 72 trees compared to 2,780 feet in 36 trees on private areas. Since practically all of these 36 trees were thrifty and above 8 inches in diameter they are well worth the carrying charge for fire protection only. The table also shows a similar situation in the 140 to 160-year age class. Here, the total volume of residual stand remaining on private areas per acre was 5,052 feet of which only 70 feet was white pine. It is also somewhat more defective than the timber of the 80 to 100-year age class, but nevertheless is still worth the carrying charge for fire protection only. The situation changes in the 200 plus age class. Residual stands on both Forest Service and private areas were over 50% defective and contained no white pine on private areas and only 6% of the gross residual volume was white pine in Forest Service areas. The possibilities of value increases from sound wood growth on these decadent areas are remote. If merchantable wood production alone were considered, it is doubtful if they would be worth the carrying charge of fire protection.

SUMMARY OF UNUSED WOOD

There was a loss of 1,230 feet net log scale per acre of all species for the average acre logged in the white pine region during 1928. This volume was similar in quality to the volume removed from the area and met existing utilization specifications. The average operator aimed to remove at least three-fourths of it along with the volume logged. Whether or not these 1,230 feet are profit-bearing could only be shown by a detailed cost and value study of this material. The fact that these 1,230 feet were left behind does, however, indicate the degree of success or failure attained under existing standards of woods supervision. It is, no doubt, a fact that this material (1,230 feet) or at least a part of it, as well as a certain percentage of the material removed per acre in 1928, could not be handled profitably under the current depression in the lumber market nor at any other time. It is quite generally agreed that the large white pine operator will sooner or later resort to some degree of selective logging. This will mean handling higher quality logs and a greater percentage of logs in the profitable size classes. When this takes place, can the operator still afford to leave behind 35 feet of the same class of white pine as he is logging, for every 1,000 feet of white pine logs removed from the area?

There are a number of questions concerning utilization of white pine that this report has endeavored to answer. How much of the white pine tree does the lumberman leave in the woods? What is the form of this unused wood material? How much of this wood material left behind might really be considered as economic waste during normal business conditions? Similar data to that presented in this report are presented in two other reports, one for the ponderosa pine type, and one for the larch, Douglas fir and lodgepole pine types, combined.

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WOOD MATERIAL PER ACRE LEFT AFTER LOGGING
REGIONAL AVERAGE
WESTERN WHITE PINE TYPE
TABLE A

STUMP DATA

SPECIES	Hgh't Ins. Ave. Stump Woods Run	Basis No. of Stumps	No. Per Acre	Hgh't Ins. Ave. Sound Stump	Hgh't Ins. Ave. Def. Stump	% Stumps Defective	Net Vol. Logged Ft. B.M.	Merch. Waste Ft. B.M.
	1	2	3	4	5	6	7	8
White Pine	14.5	3,154	39.6	14.5	14.6	37.6	17,840	216
All Species	(1)	(1)	(1)	(1)	(1)	(1)	25,330	412

(1) Data not computed.

LIVE UNCUT TREES LEFT -- 8 INS. D.B.H. and UP. and REPRODUCTION

SPECIES	D.B.H. Ins. Average Tree	Basis No. Trees	NUMBER & VOLUME FT. B.M. Per Acre	Seed Trees	Other Sound	Def. Trees Gross	Def. Trees Net	Net Volume	Gross Volume	Reproduction Number
	9	10	11	12	13	14	15	16	17	18
White Pine	10.2	685	7.9	885	156	75	21	1,062	1,134	4
All Species	14.5	3950	45.7	2700	4065	3790	695	7,460	10,639	67

CUBIC FEET OTHER MATERIAL LEFT IN WOODS

SPECIES	Cord Wood	Pulp Wood	Total Pulp & Cord Wood	POLES & PILING 20' Long	25' Long	All L.F.	All C.F.	POSTS No.	POSTS C.F.	Grand Total C.F.
	19	20	21	22	23	24	25	26	27	28
White Pine	216	--	216	--	--	--	--	--	--	216
All Species	327	123	450	1.2	.3	42	13	43	61	524

FEET B.M. SAWLOG MATERIAL LEFT IN WOODS and CULL DATA

SPECIES	NET SCALE Butt Scale	Butt No.	Middle Scale	Middle No.	Top Scale	Top No.	Total Scale	Defect Scale All Logs	Per Cent Woods Cull	Per Cent Cull Landing Scale
	29	30	31	32	33	34	35	36	37	38
White Pine	60	.8	160	5.5	182	11.7	402	706	3.3	9.5
All Species	194	2.1	365	6.1	256	14.4	815	1,252	4.1	9.5

DEAD TREES LEFT STANDING

SPECIES	Cord Wood C.F.	Cedar No. Posts	Cedar C.F.	Total C.F.	Merch. Ft. B.M.	Total No.
	39	40	41	42	43	44
White Pine	231	--	--	231	2	3.5
All Species	588	3.6	4.5	593	2	13.8

WASTE SUMMARY

SPECIES	Cubic Feet Total of Material Other Than Merch. Sawlogs and Merch. Dead Trees	Ft. B.M. Total of Sawlog Material, Loss in High Stumps and Merch. Dead Trees	Ft. B.M. of Merch. Waste Per M. Ft. (Net) Logged
	45	46	47
White Pine	447	620	35
All Species	1117	1229	49

Table No. B

WASTE ON TYPICAL CEDAR POLE CHANCE

Species	Sawlogs Ft. BM Net	Sawlogs Ft. BM De-fect	Cord Wood C.F.	Pulp Wood C.F.	Merch. Poles L.F.	Poles Wasted for Defect L.F.*	Split & Round Posts Pc's **	H'ght Av. Stump Woods Run Ins.	H'ght Av. Sound Stump Ins.	H'ght Av. Defec-tive Stump Ins.	% Stumps Defec-tive	Waste in Stumps Ft. BM	Net Volume Removed Ft. B.M. 1-*	Total Waste Ft. B.M.	Total Waste Cubic Feet
W.P.	158	1703	387					10.5	9.2	10.3	49	95	15,800	253	387
W.F.	26	5		36									None	26	36
Hm.		88		12									None	--	12
L.			131					18.5				7	350	7	131
D.F.	83		3				**						None	83	3
Ced.	94	1075			72	552	242	22.6				109	3,370	203	570
All	361	2871	521	48	72	552	242	15.5				211	19,520	572	1139

* Based on tally of 21 1/5-acre plots including pole-long butts and tops cut back because of minor defect not within Ass'n specification limits, or to comply with market demand for short poles.

** An unavoidable loss under present economic conditions.

1-* Cull % landing scale, 18.8%; woods cull, or material left in woods, 10.8%; breakage, 2%; or Total 31.6%.

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SUPPLEMENTAL TABLES

RESIDUAL WOOD AFTER LOGGING

IN THE

WESTERN WHITE PINE REGION

BY

I. V. ANDERSON, ASSOCIATE FORESTER,
NORTHERN ROCKY MOUNTAIN FOREST AND RANGE
EXPERIMENT STATION.

CHART I.
UTILIZATION OF THE AVERAGE WESTERN WHITE PINE TREE

R-I OFFICE OF PRODUCTS FOREST SERVICE MISSOULA MONTANA

100%

64½% LUMBER

92% SAWLOGS **

3.2% BREAKAGE

2.3% STUMP NON-MERCH

5% STUMP MERCH

1.2% TOP NON-MERCH

.3% TOP MERCH

35½% NOT LUMBER

27% SLABS

57% SAWDUST

9% EDGINGS

7% TRIMS

35½%

22½% UTILIZED AS

12% LATH

15% FUELWOOD (SOLD)

6% MOULDING & SHORT BOX

67% USED AS MILL FUEL

8% [redacted]

* 13% [redacted]

20% [redacted]

NEEDLES, BRANCHES AND TOPS LESS THAN 4" IN DIAMETER AND STUMP BELOW GROUND LINE NOT-INCLUDED.

THE AVERAGE WESTERN WHITE PINE TREE LOGGED IN NORTH IDAHO IS 23" IN DIAMETER BREAST HIGH.

** THIS INDICATES 13% OF SAWLOGS ARE ABSOLUTE WASTE IN MILL - NOT 13% OF ENTIRE TREE - 12% OF TREE (13% X 92%) IS ABSOLUTE WASTE IN MILL.*

*** BASED ON MILL UTILIZATION IN 1925.*

WOOD MATERIAL PER ACRE LEFT AFTER LOGGING
BY AGE CLASSES
WHITE PINE TYPE

TABLE NO. 1 - PART 1

Age	Basis		Ft. B.M. Sawlog Material Left In Woods									Other Material Left In Woods In Cubic Feet										Stump Data						
			Net Scale						Defect	Per	Cull Per				Poles & Piling			Posts		Tot.	Total	H'ght	Basis	No.	H'ght	H'ght	%	Net	Meron
			Butt		Mid		Top		Scale	Cent	Cent									20	16	Ins. Ave.			Ins. Ave.	Ins.		Vol.	
	No.								All	Woods	Landing	Cord	Pulp	Total of			All			&	&	Stump			Ave. Sound	Def.	Stumps	Logged	Waste
Years	Plots	Species	Scale	No.	Scale	No.	Scale	No.	Scale	Cull	Scale	Wood	Wood	14 & 15	20	25	L.F.	C.F.	No.	C.F.	22	23	24	Run	Stumps	Acre	Stump	Stump	Defective	Ft. B.M.	Ft. B.M.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
80	54	W.P.	66	1.8	169	5.2	266	19.8	501	57	.26	6.6	128		128								128	15.8	612	56.6	16.4	13.6	19.6	20,450	341
-		W.P.	13	.2	63	1.2	26	1.	102	10				50	50								50	15.4	105	9.7				4,220	58
		Hm.								-				.3	.3								.3								
		L.					15	.6	15	6			19	.2	19								19	17.7	11	1.				380	5
100		D.F.	6	.2	25	.6	15	.6	46				28		28								28	18.4	59	5.5				1,620	47
		All	86	2.2	270	7.2	331	22.6	687	83			204	52	256			NONE					256	16.0	800	74.1				27,310	461
101	80	W.P.	16	.4	136	5.1	246	16.7	398	35	.24	8.3	150		150								150	14.4	723	45.2	15.3	13.1	38.9	16,447	244
		W.F.	81	.7	107	1.6	55	2.1	243	27				84	84								84	21.0	211	13.2				4,760	101
-		Hm.							7					5	5								5	30.7	3	.9				51	3
		L.	19	.2	17	.4	16	.7	52	2			46		46								46	26.1	84	5.3				1,116	32
120		D.F.	49	.6	14	.3	29	.9	92	7			46		46								46	22.2	159	9.9				3,124	85
		All	176	2.6	291	6	355	20.8	822	72			247	96	343	1.2	.5	38	10	27	36	46	389	17.9	1,329	83.1				27,296	536
121	31	W.P.	97	1.	230	4.5	203	13.7	530	344	2.	9.	273		273								273	14.5	243	39.2	12.7	16.0	55.1	17,375	215
-		W.F.	60	.5	73	1.3	37	1.3	170	227				101	101								101	23.6	54	8.7				3,900	59
		Hm.								21				38	38								38	31.5	9	1.5				357	44
		L.	11	.1	82	.8	37	.1	130	8			85		85								85	22.4	23	3.7				1,578	56
140		D.F.					36	1.3	36				49		49								49	19.9	23	3.7				1,759	56
		All	168	1.6	424	7.3	319	17.6	911	614			417	145	562	.2	.2	12	4	18	22	26	586	18.8	393	83.4				26,029	504
141	70	W.P.	86	.6	104	2.1	143	10.2	283	310	1.9	7.	220		220								220	11.4	541	38.6	10.6	15.7	26.2	15,020	146
		W.F.			16	.1	4	.1	20	38				20	20								20	18.3	15	1.1				702	12
-		Hm					7	.3	7	17				66	66								66	25.6	69	4.9				1,502	30
		L.	17	.3	20	.3	9	.2	46	1			43		43								43	18.9	30	2.1				636	14
160		D.F.	8	.1	11	.1	1	.1	20				49		49								49	17.8	23	1.6				247	15
		All	96	1.2	174	3.1	172	11.3	442	371			329	96	425	.9	.1	25	8	21	30	38	463	15.1	731	52.2				18,679	295
161	60	W.P.	96	.7	168	3.2	147	7.9	411	1,007	5.4	9.6	234		234								234	14.9	382	31.8	13.7	16.0	55.1	17,810	175
-		W.F.	92	.5	67	.9	35	1.2	194	195				76	76								76	22.3	91	7.6				3,270	65
		Hm	12	.1	98	.9	12	.3	122	45				53	53								53	22.7	40	3.3				1,575	28
		L.			11	.2	5	.2	16	146			48		48								48	25.6	30	2.5				1,410	16
180		D.F.			2	.1	22	.5	24	67			19		19								19	18.3	23	1.9				525	19
		All	340	3.1	386	6.1	242	10.7	968	1,739			307	133	440	.4	.3	45	12	52	81	93	463	20.1	717	59.8				27,000	411
181	48	W.P.	125	1.2	239	4.6	134	7.3	498	1,026	6.5	5.1	518		518								518	19.2	291	30.3	20.7	17.3	42.3	25,410	248
		W.F.	12	.1	64	.7	22	.1	98	111				14	14								14	23.8	15	1.6				1,840	18
-		Hm.	29	.1	100	.3	13	.4	142	382				203	203								203	21.1	48	5.0				2,070	31
		L.	52	.4	135	.6	15	.5	202	102			233		233								233	19.2	20	2.1				980	15
200		D.F.	14	.1	4	.1			18	16			23		23								23	22.8	5	.5				510	8
		All	206	1.8	630	7.6	190	9.5	1,076	2,190			774	259	1,033	.1	.1	53	40	43	63	103	1,136	23.0	465	48.2				30,460	430
	89	W.P.	21	.3	91	1.7	81	3.5	193	1,586	10.	18.3	165		165								165	15.1	562	21.5	11.9	14.3	50.3	13,655	104
200		W.F.	4	.1	58	.8	11	.4	116	185					25								25	23.1	16	1.1				887	9
		Hm.	12	.1	60	.7	6	.2	79	85			1	110	111								111	22.2	59	3.3				1,210	22
+		L.	10	.1	24	.2	15	.4	49	288			90		90								90	29.4	49	2.9				1,390	5
		D.F.	7	.1	11	.1	7	.1	25				3		3								3	35.8	16	1.				147	3
		All	165	1.8	390	4.5	128	4.9	625	2,725			264	139	403	2.3	.5	75	21	98	131	152	555	20.4	731	45.				18,800	191
REGIONAL AVERAGE ALL AGE CLASSES																															
	438	W.P.	60	.5	160	3.5	182	11.7	402	706	3.3	9.5	216		216								216	14.5	3,154	39.6	14.5	14.6	37.6	17,890	216
			92	.5	365	6.1	256	14.4	815	1,252	4.1	9.5	327	123	450	.2	.3	42	13	43	61	74	524							23,300	411

WOOD MATERIAL PER ACRE LEFT AFTER LOGGING
BY AGE CLASSES
WHITE PINE TYPE

TABLE NO. 1 - PART 2

Age	Basis		Dead Trees						Live, Uncut Trees Left - 8 Ins. D.B.H. and Up										Waste Summary			
				Cedar					Ave.	Basis	No. Volume Ft. B.M.											
Years	No. Plots	Species	Cord Wood C.F.	No. Posts	C.F.	Total C.F.	Merch. Ft. B.M.	Total No.	D.B.H. Tree Ins.	No. Trees	Per Acre	Seed Trees	Other Sound	Def. Trees Gross	Def. Trees Net	Damage From Logging	Net Vol.	Gross Vol.	C.F. Columns 24-36 *	Ft. B.M. Columns 10, 32, 37	Ft. of Merch. Waste Per M Ft. (Net) Logged	Number Reprd.
1	2	3	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
80	54	W.P.	73			73	10	2.7	9.9	261	24.2	1,230	334	108	9	19	1,573	1,691	201	852	42	23
		W.F.	5			5		1.2	11.3	91	8.4	250	418	205		9	668	882	55	160		45
-	(1)	Hm.							9.7	6	.6		10	11			10	21	.3			3
		L.						.2	14.5	16	1.5	115	154	46			269	315	19	20		.1
100		D.F.	10			10		1.	14.8	118	10.3	16	1,440	12			1,456	1,468	38	93		2
		All	157			157	10	9.6	11.5	539	49.1	1,804	2,492	439	15	31	4,311	4,766	413	1,158	42	77
101	80	W.P.	73			73		2.1	10.6	76	4.8	153	293	9	4	41	450	496	223	642	39	8
		W.F.	3			3		5.3	14.4	209	13.1	1,200	1,750	4,360	14	48	2,364	7,358	87	344		16
-	(2)	Hm.							11.0	3	.9		9	6			9	15	5	10		4
		L.	19			19		.8	16.0	27	1.7	153	306	71	6	6	465	536	65	84		.5
120		D.F.	29			29		2.8	17.6	55	3.4	250	590			4	840	844	75	177		.4
		All	124	4.5	4.6	129	4	11.7	13.5	461	28.8	1,860	3,140	528			5,000	5,528	518	1,361	50	47
121	31	W.P.	194			194		4.7	11.5	38	6.1	424	45	210	108	80	577	759	467	745	43	9.3
		W.F.	22			22		3.4	14.5	53	8.5	68	620	345	95	37	783	1,070	123	229		32.4
-	(3)	Hm.							11.8	11	1.8		140	35			140	175	38	44		10.9
		L.	140			140		1.1	18.5	21	3.4	620	610	145	10		1,240	1,375	225	186		
140		D.F.	118			118		5.5	16.1	41	6.6	535	1,295	82	55		1,885	1,912	167	92		2.6
		All	489	.1	.1	489		16.	13.8	218	35.2	1,895	2,795	1,045	315	117	5,005	5,852	1,077	1,415	54	75
141	70	W.P.	378			378		5.7	12.4	165	11.8	1,720	293	43	24	14	2,037	2,070	598	430	29	3.8) Basis-69 Plots
		W.F.	3			3		1.	15.2	82	5.9	229	731	503	183	5	1,143	1,468	23	32		12.3)
160	(4)	H.M.						.4	11.5	158	11.3	37	920	306	26		983	1,263	66	27		28.8)
		L.	59			59		1.4	18.0	24	1.7	136	255	74	29		420	465	102	60		2.0)
		D.F.	139			139		7.9	19.2	116	8.3	210	2,280	9	5	6	2,495	2,505	188	35		3.1)
		All	617			617		19.1	13.9	626	45.0	2,994	4,756	1,006	267		8,017	8,756	1,080	674	36	66.0)
161	60	W.P.	274			274		2.7	12.6	37	3.1	560	19	4			579	583	508	586	33	1.7
		W.F.	2			2		6.7	12.7	184	15.6	1,460	585	1,627	264	11	2,309	3,683	78	259		11.1
-	(5)	Hm.						.4	13.9	127	10.6	7	1,085	674	76	71	1,168	1,837	53	148		7.9
		L.	176			176		1.4	16.3	16	1.7	262	162	35		118	424	577	224	34		.1
180		D.F.	12			12		1.3	18.4	32	2.7	377	435	51	10	2	822	865	31	43		1.8
		All	416	3.	5.	421		13.4	13.7	499	41.6	2,960	2,715	2,580	393	256	6,068	8,511	514	1,379	51	32.0
181	48	W.P.	360			360		5.1	17.4	39	4.1	1,605	56	2,140	48		1,709	3,841	878	746	32	.4) Basis-22 Plots
		W.F.						.7	18.6	82	8.5	1,185	2,210	853	97		3,492	4,248	14	110		8.2)
-	(6)	Hm.						1.6	15.5	201	20.9	173	1,335	3,140	1,340	5	2,848	4,653	203	173		.5)
		L.	741			741		9.2	20.2	32	3.3	1,410	286	220	81		1,777	1,916	974	217		)
200		D.F.	77			77		2.5	20.2	40	4.2	260	1,590	44			1,850	1,894	100	24		)
		All	1183	11.	12.	1,183		20.6	17.5	615	64.1	6,280	8,148	6,230	2,430	33	16,858	20,691	2,319	1,506	49	21.3)
200	89	W.P.	183			183		3.	14.2	69	3.9	665		65	11		676	730	348	297	22	2.3
		W.F.						1.2	14.9	205	11.5	260	346	2,155	139	6	745	2,767	25	127		16.1
+	(7)	Hm.						.6	17.6	443	24.9		1,720	7,900	915	43	2,635	9,663	111	107		63.7
		L.	613			613		5.8	23.7	40	2.2	745	1,175	17			1,920	1,937	703	54		1.4
		D.F.	1			1		.7	20.8	24	1.3	212	432	61	35		679	705	4	28		
		All	806	4.4	5.6	812		11.9	16.7	992	55.7	2,340	4,460	11,408	1,465	49	8,265	18,257	1,367	849	45	124.
REGIONAL AVERAGE ALL AGE CLASSES																						
	432	W.P.	231			231	2	3.5	10.2	685	7.9	885	156	75	21	18	1,062	1,134	447	620	35	4.
		All	588	3.6	4.5	593	2	13.8	14.5	3,950	45.7	2,700	4,065	3,790	695	84	7,460	10,639	1,117	1,229	49	67.

* See Table 1 - Part 1. (1) Columns 14 and 15 based on 53 plots. (2) Columns 14 and 15 based on 75 plots.

(3) Columns 14 and 15 based on 30 plots. (4) Columns 14 and 15 based on 69 plots.

(5) Columns 14 and 15 based on 52 plots. (6) Columns 14 and 15 based on 36 plots.

(7) Columns 14 and 15 based on 83 plots.

TABLE NO. 2 - WASTE INVENTORY BY COMPANIES PER ACRE

Company No.	Species	Feet B. M. Sawlog Material Left in Woods: Net Scale: Butt Scale	Butt No.	Mid. Scale	Mid. No.	Top Scale	Top No.	Total Scale	Other Material Left in Woods: Cubic Feet: Trees: Wood	Cubic: class-ified	Cubic: Sub. T: Feet	Poles and Piling: No. Pieces: 20'	25'	All Sorts	Sub. T: No. Pieces	Cubic: Feet	Stump Data: Weight: Ins.	Av. Dia.	Per: Acre:	Gross Volume: Removed in Logging: Ft. B.M.	Waste in: High Stumps: Ft. B.M.	Residual Stand: Live Uncut Trees 6" d.b.h. and Up: No. Trees: Dead	Av. Dia.	Volume Feet B.M.: Sound: Cross	Def. Trees: Net: Ins.	Misc.	Total: Gross	Total: Net	Waste Summary: Cubic Feet: 12,17 & 23	Ft. B.M.: Columns 9 & 21	Number of Reproduction
1	2	3	4	5	6	7	8	9	10	11	12	12	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	W.P.	5	.1	109	2.2	290	19	404	1447	17.6	102.7						12.1	45.0	21,200	182	2.8	131.2	12.7	4.3	178	439	144	88	96	845	766	616.8	566	.8
	W.F.	99	1.	177	2.2	59	2.1	335	1043	3.1	107.7						12.8	12.8	4,880	135	6.4		11.0	18.7	3036	315	341	93	102	3057	2911	107.7	471	6.4
1-C	Hm	--	--	--	--	--	--	--									--	--	----				--	--	--									--
	L.	36	.2	9.6	.2	1	.1	46	22.6		22.6						1.5		430	15	.5	24.6	20.3	1.4	194	54				248	248	47.6	61	--
	D.F.	21	.2	3.9	.1	2.4	.1	27	13.4	.3	13.7						3.6		1,510	82	3.7	27.7	20.5	4.8	663	1047	52	38		1769	1746	41.4	79	--
	Ced.	105	.1	19	.2	--	--	99				1.5	.5	49	22	42.5	25.7	9.5	1,250	26	.5		10.8	9.1	194	348	2		3	436	424	42.6	57	19.4
	Y.P.																				.1													
	W.P.	86	2.6	205	.7	225	18.8	516	159.7	16.2	176.0						15.5	58.9	28,500	440	3.5	94.8	9.5	15.5	703	220	36	15	32	1001	960	270.8	956	23.1
	W.F.	11	.2	44	1.2	17	.8	72	37.0		37.0						16.7	9.4	5,200	74	1.7	7.5	11.0	8.5	203	336	336	--	3	956	882	44.6	146	24.7
	Hm.																																	
	L.					9	.8	9	6.1	.2	6.4						17.	.2	56				23.0	.3	42	117	76			235	199	6.4	2	
1-3	D.F.	3	.2	26	.8	11	.8	42	32.0	1.0	33.0						19.8	5.5	1,320	96	.9	7.2	12.6	2.6	28	248	20			292	272	40.5	100	1.0
	Sp.	6	.2	15	.8	4	.2	25	2.6	--	2.6						17.0	.3	140	3	.2		10.2	.8		18	14	9	3	35	30	2.6	28	3.0
	Ced.																						8.0											
	L.P.			6	.8	12	.5	18	28.9		28.9						17.0	.9	350	9	6.7	105.8	12.3	4.4	300	148	44			490	446	132.4	27	.8
	A.F.																13	.2	33				10.0											
	Y.P.																13.0	.3	121	3												3		
	W.P.	61	1.8	212	.5	237	16.6	510	199.2	16.0	215.2						13.7	50	28,500	280	4.1	165.8	10.4	8.6	354	278	68	38	55	749	719	361.1	790	13.8
	W.F.	55	.8	98	1.8	36	1.2	189	81.8	1.4	83.2						21.1	10	4,700	85	3.9	11.0	14.3	12.0	993	1434	524	38	43	2994	2808	74.2	274	16.8
	Hm	--	--	--	--	--	--	--									--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L.	17	.2	32	.8	15	.8	64	32.6	.8	33.4						24.8	2.1	1,040	25	.3	26.0	18.9	1.1	122	209	68	0	--	499	421	49.6	89	.4
1-All	D.F.	32	.4	12	.4	26	1.0	72	43.5	.9	44.4						18.1	5.5	2,080	65	3.4	33.0	15.8	3.9	322	594	29	15	--	945	931	107.4	187	.8
	Sp.	6	.1	13	.3	6	.3	27	2.2	--	2.2						23.9	.3	110	3	.2	--	10.3	.6	6	25	4	2	2	38	37	2.2	30	1.7
	Ced.	4	.08	7	.1	--	--	11				.6	.2	20	12	21.6	36.8	4.8	700	45	.3	5.	10.8	4.8	94	126	1	0		228	222	28.6	26	8.9
	L.P.	--	--	7	.1	4	.1	11	11.0		11.0						21.8	.4	90	4	2.1	21.3	12.6	1.6	91	63	29	9	--	176	156	49.5	16	.4
	A.F.	--	--	--	--	--	--	--									16.8	.1	20	.4	--	--	9.5	.1	--	4	--	--	--	4	4		.4	--
	Y.P.	--	--	--	--	--	--	--									16.8	.1	40	1	.1	2	--	--	--	--	--	--	--	--	--	2.0	1	--
	W.P.	28	.2	32	.2	56	3.2	106	106.5	--	106.5						17.3	32.6	14,510	86	.4	20.4	10.6	2.4	3	46	150	0	--	229	49	126.9	196	.4
	W.F.	76	.8	170	2.6	86	.8	334	188.8	--	188.8						16.1	16.6	3,640	81	3.0	0	12.1	43.2	2248	624	6330	420	35	9197	3337	188.8	415	54.2
	Hm	--	--	--	--	--	--	--									--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L.	--	--	40	.8	44	.1	86	377.0	--	377.0						30.8	11.2	8,472	6	3.8	146.7	14.0	1.2	60	20	84	8	--	124	80	319.7	92	--
2-B	D.F.	--	--	8	.2	36	.1	44	34.8	--	34.8						18.8	5.2	1,720	22	3.0	0	12.8	1.0	18	22	6	3	3	52	43	34.8	68	--
	Sp.								7.7	--	7.7						17.0	.8	470	10	--	--	9.8	--	--	--	--	--	--	--	--	7.7	10	--
	Ced.								--	--	--	.3	--	7	8	16.8	37.7	7.8	1,925	27	--	--	9.8	1.0	8	--	18	0	--	26	8	19.8	27	2.8
	L.P.	14	.4	8	.8	6	.2	28	87.0		87.0						31.8	2	934	5	1.2	42.2	9.0	1.2	--	88	84	0	--	145	58	69.2	31	--
	Y.P.																				.4	28.0	--			--	--	--			28.0		
	W.P.	8	.2	116	2.6	186	13.9	312	89.0	--	89.0						16.7	44	13,910	292	1.0	6.1	9.2	3.4	85	110	--	--	11	206	206	96.1	604	2.4
	W.F.	87	.8	88	.8	65	2.4	186	101.8	--	101.8						19.8	16.1	3,670	72	3.0	0	11.5	7.8	176	143	311	0	13	532	342	101.8	361	3.7
	Hm.	--	--	--	--	--	--	--									--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
A	L.	--	--	31	.8	37	1.5	68	87.6	--	87.6						26.1	12.2	8,130	64	1.3	22.2	12.7	2.3	97	97	28	16	16	223	216	102.6	122	--
2 D	D.F.	14	.2	26	.8	23	.8	63	53.0	--	53.0						17.1	14.0	8,130	108	1.3	8.1	12.7	1.0	18	31	--	--	11	50	50	61.1	171	--
C	Sp.	11	.2	--	--	3	.8	14	2.8	--	2.8						17.0	.3	80	1.5	--	--	--	--	--	--	--	--	--	--	--	2.8	16.5	--
	Ced.	--	--	3	.8	--	--	8	--	--	--	.2	.4	28	49	66.1	22.8	6.5	1,860	24	1.1	3.0	9.6	1.6	25	26	15	0	--	64	49	71.1	27.0	14.2
	Y.P.	--	--	--	--	--	--	--	.7	--	.7						--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.7	--	--
	W.P.	17	.3	74	1.8	130	9.1	221	79.9	--	79.9						16.9	34.9	14,180	301	.7	12.8	9.7	2.9	30	80	80	--	6	226	146	93.4	422	1.8
	W.F.	82	.8	96	1.8	76	2.7	254	110.8	--	110.8						19.0	17.2	4,840	76	4.3	--	11.9	33.8	1100	383	2910	304	36	4409	1703	110.8	330	28.2
	Hm.	--	--	--	--	--	--	--									--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	L.	--	--	35	.8	41		76	165.8	--	165.8						27.9	11.8	5,960	28	2.4	77.8	13.1	1.8	80	57	50	9	9	195	152	243.8	114	--
2-All	D.F.	8	.2	18	.8	39	.2	65	47.0	--	47.0						18.8	10.1	2,320	70	2.4	4.8	21.9	1.0	18	31	3	0	6	48	49	52.1	125	--
	Sp.	6	.1	--	--	2	.1	8	2.9	--	2.9						17.4	1.0	260	5	--	--	--	--	--	--	--	--	--	--	--	2.9	13	--
	Ced.	--	--	2	.1	--	--	2	--	--	--	.5	.2	16	27	39.2	28.4	7.0	1,800	25	.6	2.6	9.7	1.2	16	14	10	--	--	40	30	41.8	27	9.1
	L.P.	6	.2	3	.1	3	.1	12	8.8	--	8.8						21.1	.9	104	2	.5	18.8	9.0	.8	--	28	38	0	--	66	28	27.8	14	--
	Y.P.								.3	--	.3						--	--	--	--	.2	12.5	--	--	--	--	--	--	--	--	--	12.8		--
	W.P.	40	.5	17	.2	34	4	91	46.8	.5	47.3						6.8	47	32,955	146	7.0	644.5	11.8	6.7	760					760	760	691.8	327	5.8
	L.F.	--	--	--	--	--	--	--	8.7	--	8.7						4.0	.5	230	0	1.8		0 10.4	7.7	225	950	--	--	--	1250	1250	8.7		4.6
3-21	Hm.	--	--	--	--	--	--	--	16.9	--	16.9						11.3	5.2	1,500	8	.8		0 10.8	12.5	--	1918	630	130	--	2648	2038	16.9	6	31.7
	L.	--	--	--	--	--	--	--	7.7	--	7.7						10.8	1.7	410	25	.8	48.2	20.0	1.8	78	775	--	--	--	917	917	55.9	28	--
	D.F.	--	--	--	--	--	--	--	--	--	--						--	--	--	--	2.0		0 20.2	1.2	--	550	--	--	--	550	550			--
	Sp.	--	--	--	--	--	--	--	1.2	--	1.2						4	.2	150	--			12.0	.5	--	30	--	--	--	30	60	1.2	9	3.5
	A.F.	--	--	25	.8	--	--	25	4.8	--	4.8						11	.2	40	--			10.3	2.0	--	280	--	--	--	280	280	4.8	25	16.2
	W.P.	11	.3	89	1.8	77	4.8	147	220.4	11.1	231.5						17.6	39	18,220	147	2.1	64.1	10.5	.4	--	20	--	--	--	20	20	234.6	314	.4
	W.F.	--	--	29	.8	5	.2	34	58.0	1.8	59.8						24.8	2.9	1,290	49	--	--	12.0	1.1	21	43	38	--	--	102	87	59.8	88	17.8
	Hm.	93	.7	182	1.8	18	.7	293	405.5	58.0	463.7						27.7	25	11,280	262	1.1		0 12.2	6.1	--	540	79	4	--	619	544	463.7	828	35.4
3-3M	L.	--	--	--	--	--	--	--	70.5	.7	71.2						23.2	1.4	578	12	.7	65.4	16.4	2.1	--	290	146	62	--	436	332	136.8	12	4.0
	D.F.	--	--	--	--	--	--	--	24.2	--	24.2						23.1	3.	470	13	--	--	28.6	.5	--	607	--	--	--	607	607	24.2	13	--
	Ced.	257	2.	144	1.2	12	.7	413	--	--	--	3.4	1.2	112	140	247.8	36.8	22.5	3,670	206	.2		0 12.0	3.0	--	300	21	--	--	321	300	247.8	621	23.6
	L.F.	--	--	--	--	--	--	--	17.0	--	17.0						27.0	.2	36	2	.2	22.0	--	--	--	--	--	--	--	--	--	39.0	8	--
	Birch	--	--	--	--	--	--	--	--	--	--						--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2
	W.P.	55	.6	122	3.	240	17.8	427	102.2	2.9	105.2						10.9	38.4	14,340	170	3.7	128.3	11.2	22.4	2190	530	43	15	20	2758	2758	244.0	597	2.0
	W.F.	7	.1	59	.8	20	.8	86	46.2	2.3	48.5						12.0	2.4	1,720	16	1.5	--	15.2	6.7	270	1200	480			1950	1470	48.5	102	--
	Hm.	--	--	--	--	3	.1	3	4.9		4.9										.1	0	10.6	5.2		290	142			432	290	4.9	3	18.5
	L.	24	.4	24	.8	22	.7	70	9.9		9.9						9.1	1.4	310	6	.3	10.8	11.1	1.9	150	270				420	420	20.7	76	.1
4-B	D.F.	14	.2	8	.2	6	.2	28	30.6	.5	30.1						15.1	2.1	520	14	10.5	199.9	13.2	24.6	210	3100	15	7		5335	5317	196.0	42	4.7
6	Sp.								4.8		4.8						10.0	.2	54	1	1.2		0 10.7	.9	50	2				63	62	4.3	1	.3
	Ced.														1.3	2.2							9.0	.3		7				7	7	2.2		3.1
	L.F.																				.1	0	9.1	.7		26				26	26			
	A.F.																				.1	0												
	Y.P.																						.4	.1		12				12	12			
	W.P.	167	1.2	116	2.6	209	11.1	492	296.0		296.0						19.4	35.	24,511	349	3.0	106.0	11.8	4.1	434	77	224		13	738	514	404.0	841	1.0
	W.F.	16	.1	108	1.3	40	1.7	159	40.0		40.0						22.2	2.8	3,217	16	2.0		0 19.1	14.3	2356	2390	1671	123		7327	5769	40.0	175	8.0
4-2	Hm.								10.9		10.9										.1	0	18.7	8.0	330	884	1444	47	7	2565	1168	10.6		.4
3	L.	63	.4	134	.8	9	.8	206	72.6		72.6						27.5	.8	76	4	5.9	508.3	16.8	4.8	1529	434	73	24		2060	1967	240.9	210	
	D.F.	16	.1	6	.1	6	.1	28	18.2		18.2						23.0	.2	161	6	4.3	101.0	20.0	6.4	500	3281	80	42		3830	3813	119.2	34	
	Ced.	54	.8					54							1.1	1.1	17.4	20.4	18.4	20.8	8.8	1,420	132	1.8		17.2	35.1	1639	4364	1476	596	3	7689	6804	186.4	186	17.9
	Sp.					4.8		4.8															12.0	.4	7	41				48	48	4.8		

WOOD WASTE IN LOGGING
PRIVATE VERSUS
FOREST SERVICE
AREAS

TABLE NO. 3 - PART 1

Age	Basis		Ft. B.M. Sawlog Material Left In Woods								Other Material Left In Woods In Cubic Feet												Stump Data				
			Net Scale						Defect	Per	Cull Per			Total	Poles & Piling				Posts		Tot.	Total	H'ght	Basis	No.	Net Vol.	Merch.
			Butt		Mid		Top		Scale	Cent	Cent			of							20	16	Ins.Av.				
Years	No. Plots	Species	Scale	No.	Scale	No.	Scale	No.	Total Scale	All Logs	Woods Cull	Landing Scale	Cord Wood	Pulp Wood	14 & 15	17	20	25	L.F.	C.F.	No.	C.F.	& 22	& 23	Stump: Woods Run	No. Stumps	Per Acre	Logged: Ft. B.M.	Waste Ft. B.M.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	F.S.	W.P.	29	.4	146	2.9	325	18.6	500				33		33								33	12	77	33	10,450	209
	P.		76	2.1	176	5.8	249	20.1	501	72			156		156								156	15	535	64	22,660	379
	F.S.	W.F.	29	.4	117	1.7	46	1.7	192	8				70	70								70	11	14	6	3,230	23
	P.		8	.1	48	1.3	20	.8	76	11				45	45								45	16	91	11	4,400	68
	F.S.	Hm.												1	1								1					
	P.																											
80	F.S.	L.					42	1.7	42	13			6		6								6	17	7	3	660	22
-	P.						7	.4	7	4			24		24								24	20	4	.5	590	
	F.S.	D.F.					25	.8	25				8		8								8	11	12	3	1,185	28
	P.		7	.2	32	.7	12	.1	51				34		34								34	20	47	6	1,695	33
100	F.S.	I.P.																										
	P.				5	.1	10	.4	15	14			35		35								35	20	7	.8	170	7
	F.S.	Y.P.																						10	1	.4	80	2
	P.																							17	2	.2	90	3
	F.S.	Ced.																			.1	.1	.1	.1				
	P.																								2			
	F.S.	Sp.																										
	P.		5	.1	12	.2	3	.2	20					2	2								2	18	1	.2	85	2
	F.S.	A.F.																										
	P.																							13		.1	25	
TOTAL	F.S.	All	58	.8	263	4.6	438	23.0	759	21	Neg.	4	47	71	118						.1	.1	118	12	111	47.4	15,605	284
TOTAL	P.	All	96	2.3	273	5.1	301	22.0	670	101	.3	7	243	47	290						.1	.1	290	15	689	82.8	29,805	512
	F.S.	W.P.	41	.7	61	1.8	150	10.9	252	338			247		247								247	10	145	33	13,430	90
	P.		65	.9	241	4.1	196	11.5	502	406			381		381								381	16	132	80	16,010	195
	F.S.	W.F.			43	.2			43	7				19	19								19	11	5	1.1	1,045	2
	P.				12	.3			12					30	30								30	26	5	1.3	1,110	43
	F.S.	Hm.					7	.2	7					14	14								14					
	P.						20	.7	20	71				221	221								221	30	32	15.3	4,830	225
141	F.S.	L.											37		37								37					
-	P.									6			38		38								38	28	8	2.4	560	18
	F.S.	D.F.	45	.7	32	.4	14	.4	91				54		54								54	11	4	.3	82	3
	P.												96		96								96	27	5	1.5	210	42
160	F.S.	I.P.											2		2								2					
	P.												28		28								28					
	F.S.	Y.P.																										
	P.																											
	F.S.	Ced.														.2		11	4	9	13	17	17					
	P.		82	.3	47	.3	6	.3	135							2.4	.3	54	15	62	90	105	105	36	27	7.9	870	54
	F.S.	Sp.												2	2								2	10	1	.2	55	1
	P.		41	.3	47	1.2	6	.3	94					11	11								11					
	F.S.	A.F.																										
	P.																											
TOTAL	F.S.	All	86	1.4	136	2.4	171	11.5	392	339	2.3	4.2	340	35	375	.2		11	4	9	13	17	392	10	135	35.2	14,612	96
TOTAL	P.	All	188	1.5	347	5.9	228	13.0	763	483	2.1	7.2	543	262	805	2.4	.3	54	15	62	90	105	910	22	239	87.4	23,990	575
	F.S.	W.P.	85	1.2	462	8.5	176	8.7	723	1,010			652		652								652	15	128	32.	27,900	181
	P.		154	1.3	72	1.8	104	6.2	337	1,037			349		349								349	23	163	29.1	22,030	295
	F.S.	W.F.																										
	P.		20	.2	109	1.3	37	1.8	166	191				32	32								32	24	15	2.7	3,250	20
	F.S.	Hm.	70	.2	208	.2	30	1.	308	914				252	252								252	18	30	7.5	2,900	10
	P.				23	.4			23					142	142								142	26	18	3.2	1,450	46
181	F.S.	L.	15	.2	88	1.	20	.8	123	8			367		367								367	18	18	4.5	2,270	30
-	P.		79	.5	170	.4	11	.4	260	170			64		64								64	27	2	.4	90	5
	F.S.	D.F.											25		25								25	25	2	.5	365	4
200	P.		20	.2	7	.2			27	27			21		21								21	21	3	.5	285	10
	F.S.	Ced.	12	.2	148	2.2			157	1,092						.3		42	14	42	56	70	70	32	29	7.2	1,750	68
	P.		37	.4	50	.2			87	148						.9	.2	77	41	25	41	82	82	29	46	8.2	1,710	139
	F.S.	Sp.			20	.3	15	.5	35	28				72	72								72	16	9	2.2	930	19
	P.													5	5								5					
TOTAL	F.S.	All	182	1.8	923	12.2	241	11.	1,360	3,052	7.6	4.0	1044	324	1,368	.8		42	14	42	56	70	1,438	18	216	53.9	36,165	310
TOTAL	P.	All	310	2.6	438	4.3	152	8.4	900	1,873	5.1	4.9	434	179	613	.9	.2	77	41	25	41	82	695	24	247	44.1	28,615	515
	F.S.	W.P.	4	.1	128	2.6	93	3.9	225	1,402			194		194								194	10	198	20	10,970	60
	P.		48	.5	64	1.0	86	3.8	198	1,135			106		106								106	13	92	21.9	16,900	187
	F.S.	W.F.			8	.2	3	.1	11	4				13	13								13					
	P.		157	.5	143	1.7	21	.7	321	486				60	60								60	34	4	1.0	25	15
	F.S.	Hm.			26	.4	7	.2	33	63				66	66								66	15	11	1.	225	1
	P.				152	1.4			152	155				315	315								315	26	39	9.3	3,910	107
	F.S.	I.	16	.1	21	.1	3	.1	40	3			53		53								53	22	10	1.	415	9
	P.				48	.7	54	1.2	102	1,145			303		303								303	32	37	8.0	4,330	
	F.S.	D.F.	11	.1	18	.2	6	.1	35				1		1								1	13	2	.2	35	
200	P.						14	.2	14				16		16								16	37	14	3.3	450	11
	F.S.	Ced.	53	.7	63	.7	6	.3	122	304						.3	.3	73	16	102	133	153	153	23	128	13	1,890	69
+	P.		145	1.2	164	1.4	17	1.0	326	1,079						1.9	1.4	102	33	120	193	216	216	37	87	20.7	2,910	126
	F.S.	L.P.											6		6								6					
	P.																											
	F.S.	Sp.											1		1								1					
	P.																											
	F.S.	A.F.											4		4								4					
	P.																											
	F.S.	Y.P.			22	.2			22	7																		
	P.																											
TOTAL	F.S.	All	84	1.0	264	4.4	118	4.7	466	1,983	10.0	19.2	254	84	338	.3	.3	73	18	103	135	153	491	16	349	35	13,535	139
TOTAL	P.	All	350	2.2	593	6.4	192	6.9	1,113	4,007	9.8	18.1	425	375	800	1.9	1.4	102	33	120	193	216	1,016	29	273	65	28,525	446

WOOD WASTE IN LOGGING
PRIVATE VERSUS
FOREST SERVICE
AREAS

TABLE NO. 3 - PART 2

Age	Basis		Dead Trees						Live, Uncut Trees Left - 8 Ins. D.B.H. and Up									Waste Summary		
			Cord Wood	Cedar		March.			D.B.H.	Basis	No. Volume Ft. B.M.							C.F.	Total Columns 10 - 29 - 34	
									Av.							Damage				Ft. of Waste Per M
Years	No. Plots	Species	C.F.	No. Posts	C.F.	Total C.F.	Ft. B.M.	Total No.	Tree Ins.	No. Trees	Per Acre	Seed Trees	Other Sound	Def. Trees Gross	Def. Trees Net	From Logging	Net Vol.	Gross Vol.	Columns 24* -33	Ft. B.M.	Ft. (Net) Logged
1	2	3	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	F.S.	W.P.	67			67		2.5	10.8	99	41.2	3,280	475	35			3,755	3,790	100	709	68
	P.		75			75	13	2.7	9.3	162	19.3	644	294	130	17	25	955	1,093	231	893	39
	F.S.	W.F.						.4	13.8	12	5.		455				465	465	70	215	
	P.		6			6		1.4	10.9	79	9.4	320	405	263		12	725	1,000	51	144	
	F.S.	Hm.							9.7	6	2.5		45	50			45	95	1		
	P.													60				60			
80	F.S.	L.							13.5	12	5.	280	370				650	650	6	64	
	P.								17.5	4	4.8	69	92	15			161	176	24	7	
-	F.S.	D.F.	13			13		.8	14.8	52	21.7		2,875				2,875	2,875	21	53	
	P.		9			9		1.	14.8	66	5.4	20	1,033	62			1,053	1,115	43	104	
100	F.S.	L.P.							9.0	4	1.7		75				75	75			
	P.		86			86		5.8	12.2	33	3.9	236	123				359	359	121	22	
	F.S.	Y.P.							11.0	2	.8	50					50	50		2	
	P.		5			5		.1	14.0	1	.1		14				14	14	5	3	
	F.S.	Ced.																			
	P.								8.0	1	.1			11	7	2	7	13			
	F.S.	Sp.																			
	P.							.1	10.2	5	.6		14				14	14	2	22	
	F.S.	A.F.																			
	P.								10.0	1	.1										
TOTAL	F.S.	All	80			80		3.7	12.2	187	77.9	3,610	4,305	85			7,915	8,000	198	1,043	87
TOTAL	P.	All	181			181	13	11.8	11.1	352	43.7	1,239	1,975	541	24	39	3,288	3,844	477	1,195	40
	F.S.	W.P.	272			272		6.8	12.6	101	23.0	3,251	804	136	77	45	4,132	4,236	519	342	25
	P.		358			358		4.4	10.0	3	.9	35	35				70	70	739	697	44
	F.S.	W.F.						1.8	14.1	34	7.7	200	477	877	557		1,234	1,354	19	43	
	P.								15.1	15	4.4	335	371	736			706	1,444	50	55	
	F.S.	Hm.						.8	9.1	69	15.7		514	548		14	514	1,076	14	7	
	P.							.9	11.4	18	5.3		370	126	32		402	496	221	243	
141	F.S.	L.	60			60		2.1	10.6	7	1.6	187	14	105	25		226	306	97		
	P.		51			51		1.2	16.2	5	.8		362	171	85		447	533	89	18	
-	F.S.	D.F.	202			202		16.8	15.9	89	20.2	207	5,839				6,046	6,046	256	94	
	P.		244			244		9.4	21.6	21	6.2	597	1,432	44	21		2,050	2,079	340	42	
160	F.S.	L.P.																	2		
	P.		14			14		.3											42		
	F.S.	Y.P.																			
	P.							.3													
	F.S.	Ced.							10.0	10	2.3	127	4	68		7	131	205	17		
	P.							.3	14.4	11	3.2		459				459	459	105	189	
	F.S.	Sp.						2.7	12.0	5	1.1	127					127	127	2	1	
	P.																		11	94	
	F.S.	A.F.						.2													
	P.																				
TOTAL	F.S.	All	534			534		30.7	13.8	315	71.6	4,099	7,652	1,734	659	66	12,410	12,551	928	489	33
TOTAL	P.	All	667			667		16.8	15.8	74	21.8	967	3,029	1,079	136		4,134	5,075	1,377	1,338	57
	F.S.	W.P.	823			823		9.5	17.4	30	7.5	4,405		172	115		4,520	4,577	1,475	904	2.8
	P.		28			28		2.	17.1	9	1.6	389	96	248			485	730	377	632	2.5
	F.S.	W.F.							8.0	1	.2			5			5				
	P.							1.3	18.7	81	4.5	2,029	3,791	1,507	166		5,986	7,327	32	186	
	F.S.	Hm.	1127			1,127		3.2	14.7	166	41.5	12	1,658	7,285	3,138		4,808	8,938	1,379	318	
181	P.							.4	18.7	35	8.2	288	1,105	1,805	59	9	1,452	3,207	142	69	
-	F.S.	L.	8			8		1.	20.7	17	4.2	2,242		395	152		2,394	2,837	375	153	
	P.		609			609		5.4	19.6	15	2.6	818	491	95	30		1,339	1,404	673	265	
	F.S.	D.F.						.2	26.	2	.5	378					378	378	25	4	
200	P.		122			122		4.1	19.9	38	5.8	177	2,725	75			2,900	2,975	147	37	
	F.S.	Ced.	15			15		1.	19.2	40	10.	1,395	95	1,917	1,070	30	2,760	3,637	85	223	
	P.			18	21	21		1.3	17.8	169	30.2	1,371	4,386	1,573	693	4	6,450	7,334	103	228	
	F.S.	Sp.						1.	15.3	9	2.2	325	105	35	20	32	450	497	72	54	
	P.								12.	3	.5	9	52				61	61	3	3	
TOTAL	F.S.	All	1973			1,973		29.5	16.2	265	66.1	8,957	1,858	9,792	4,425	62	15,310	20,669	3,411	1,656	46
TOTAL	P.	All	763	18	21	784		14.5	18.4	350	52.4	5,081	12,644	5,300	948	13	18,673	23,028	1,479	1,415	49
	F.S.	W.P.	225			225		3.	15.	50	5.	912		27	19		931	939	419	285	2.6
	P.		59			59		1.7											165	385	2.3
	F.S.	W.F.						.3	12.4	92	9.		6	82			6	88	13	11	
	P.							2.8	16.2	83	19.8	1,112	590	5,086	543	26	2,245	6,814	60	336	
	F.S.	Hm.						.6	17.9	351	36		2,344	12,015	1,518	78	3,862	14,437	66	54	
	P.							.5	15.4	14	3.3		300	983	5		305	1,283	315	259	
	F.S.	L.	980			980		5.	25.1	24	2.	1,061	1,433	20			2,494	2,514	1,033	49	
	P.		280			280		4.2	17.6	5	1.2	150	107	26			257	283	583	102	
	F.S.	D.F.						.2	20.1	14	1.	373	214	86	64		651	673	1	35	
	P.							1.4	25.0	4	1.0	28	810				838	838	16	25	
200	F.S.	Ced.	2	6	8	10		.4	14.7	121	12.	193	289	1,374	514		976	1,856	163	191	
+	P.								17.2	45	10.7	700	1,424	50			2,124	2,174	216	452	
	F.S.	L.P.	14			14		.5	14.0	6	.6		94	28			94	122	20		
	P.																				
	F.S.	Sp.							8.0	1	.1	2	14				16	16	1		
	P.																				
	F.S.	A.F.							11.0	2	.2								4		
	P.																				
	F.S.	Y.P.																		22	
	P.																				
TOTAL	F.S.	All	1221	6	8	1,229		13.	16.6	861	67.	2,541	4,394	13,632	2,115	78	9,050	20,645	1,720	627	46
TOTAL	P.	All	339			339		10.7	16.7	151	36.	1,990	3,251	6,145	348	26	5,789	11,992	1,355	1,359	55

* See Table No. 3 - Part 1.

TABLE 4

COMPARISON OF RESIDUAL STANDS AFTER LOGGING

WHITE PINE TYPE BY AGE CLASSES

VOLUME PER AVERAGE ACRE

80 - 100 Age Class

Diam. Breast High Inches	White Pine			Hemlock			White Fir			Cedar			Larch			Douglas Fir			Englemann Spruce			Lodgepole Pine			Alpine Fir			Total		
	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.	No. Trees	Net Vol. Ft. B.M.	Gross Vol. Ft. B.M.
8 F.S.	13.8	421	421	.8	9	21	--	--	--	--	--	--	--	--	--	.4	9	9	.8	25	25	--	--	--	--	--	--	15.8	464	476
P.	8.4	216	216	--	--	--	2.9	79	79	--	--	--	--	--	--	.4	14	14	.2	6	6	--	--	--	--	--	--	12.0	315	315
10 F.S.	8.8	308	308	1.3	--	38	1.7	63	63	--	--	--	.4	17	17	2.5	83	83	--	--	--	.8	30	30	--	--	--	15.5	721	759
P.	6.4	392	392	--	--	--	3.5	222	222	--	--	--	--	--	--	1.1	68	68	.3	18	18	1.7	108	108	--	--	--	12.9	808	808
12 F.S.	8.8	1,221	1,221	.4	38	38	2.1	229	229	--	--	--	.8	83	83	6.3	467	467	--	--	--	--	--	--	--	--	--	18.4	2,038	2,038
P.	2.1	220	220	--	--	--	1.2	161	161	NONE	--	--	.5	44	44	--	--	--	--	--	--	1.4	142	142	NONE	--	--	5.2	567	567
14 F.S.	5.8	550	583	--	--	--	.4	71	71	--	6.3	475	475	1.7	171	171	.4	42	42	--	--	--	--	--	--	--	--	9.6	1,309	1,342
P.	.5	48	68	--	--	--	.3	26	52	IN	--	--	.5	36	36	.3	29	33	.9	123	153	--	--	--	IN	--	--	2.5	262	342
16 F.S.	4.2	975	975	--	--	--	.8	233	233	--	--	--	.4	96	96	3.8	942	942	--	--	--	--	--	--	--	--	--	9.2	1,946	1,946
P.	.2	49	49	--	--	--	.8	49	82	STAND	--	--	--	--	--	.2	27	27	--	--	--	.9	171	198	STAND	--	--	2.1	297	332
18 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3	792	792	--	--	--	--	--	--	--	--	--	3.3	792	792
P.	.1	42	42	--	--	--	--	--	--	--	--	--	.2	42	42	--	--	--	--	--	--	--	--	--	--	--	--	.3	84	84
20 F.S.	--	--	--	--	--	--	.4	223	223	--	--	--	--	--	--	1.7	433	433	--	--	--	--	--	--	--	--	--	2.1	656	656
P.	--	--	--	--	--	--	.2	0	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	--	100
22 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.4	168	168	--	--	--	--	--	--	--	--	--	.4	168	168
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.4	125	125	--	--	--	--	--	--	--	--	--	.4	125	125
P.	--	--	--	--	--	--	.2	109	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	109	109
26 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	105	105	--	--	--	--	--	--	--	--	--	.2	105	105
28 F.S.	--	--	--	--	--	--	.1	--	182	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.1	--	182
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tot. F.S.	36.1	2,675	2,708	2.5	47	97	5.5	821	1,003	--	4.9	671	671	20.6	2,801	2,801	.8	51	51	1.3	73	73	--	--	--	--	--	72.0	6,141	8,406
Tot. P.	17.7	963	963	--	--	--	8.9	841	783	--	.2	42	42	2.9	294	294	.9	83	97	4.9	544	614	--	--	--	--	--	35.1	2,537	2,775

140 - 160 Age Class

8 F.S.	4.2	170	177	5.2	57	116	.7	34	34	1.1	23	23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.3	284	350
P.	.6	35	35	.3	6	6	.5	9	24	--	--	--	--	--	--	.6	15	15	.3	5	5	--	--	--	--	--	--	2.4	71	85
10 F.S.	4.5	348	348	5.7	139	305	.7	68	68	.2	2	2	.5	34	34	--	--	--	--	--	--	--	--	--	--	--	--	11.3	841	757
P.	--	--	--	2.7	132	150	.3	33	33	.6	6	6	--	--	--	.3	9	9	--	--	--	--	--	--	--	--	--	4.3	152	218
12 F.S.	4.7	841	841	1.8	82	143	1.3	130	130	--	--	--	.4	57	57	1.1	86	86	.7	57	57	--	--	--	--	--	--	9.8	1,073	1,150
P.	.3	35	35	1.8	429	429	.8	76	76	.3	9	9	.8	44	44	.6	44	44	--	--	--	--	--	--	--	--	--	4.2	637	637
14 F.S.	5.8	782	787	1.8	154	259	.2	52	52	--	--	--	.2	50	50	2.5	377	377	--	--	--	--	--	--	--	--	--	8.8	1,305	1,525
P.	--	--	--	1.2	170	185	.3	50	50	--	--	--	.6	106	106	1.2	144	144	--	--	--	--	NONE	--	--	NONE	--	3.3	400	485
16 F.S.	2.4	786	802	1.4	243	304	1.1	266	343	--	--	--	.4	91	118	3.2	627	627	.2	66	66	--	--	--	--	--	--	8.7	2,079	2,260
P.	--	--	--	.3	62	62	.6	141	171	--	--	--	.3	85	85	.6	65	85	--	--	--	--	IN	--	--	IN	--	1.8	353	403
18 F.S.	2.0	330	330	.4	--	166	--	--	--	--	--	--	.9	359	359	4.8	1,226	1,226	--	--	--	--	--	--	--	--	--	7.6	2,321	2,711
P.	--	--	--	--	--	--	--	--	--	--	--	--	.6	224	224	2.4	652	639	--	--	--	--	STAND	--	--	STAND	--	3.0	883	883
20 F.S.	.4	264	264	--	--	--	.2	93	93	.4	85	154	.2	120	120	4.8	1,666	1,666	--	--	--	--	--	--	--	--	--	6.0	2,229	2,227
P.	--	--	--	--	--	--	.9	197	476	--	--	--	.6	85	171	1.8	576	576	--	--	--	--	--	--	--	--	--	3.3	858	1,223
22 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.6	677	677	--	--	--	--	--	--	--	--	--	1.6	677	677
P.	--	--	--	--	--	--	.3	229	229	--	--	--	--	--	--	.3	132	132	--	--	--	--	--	--	--	--	--	.6	361	361
24 F.S.	.2	189	189	--	--	--	.8	190	205	--	--	--	--	--	--	1.6	845	845	--	--	--	--	--	--	--	--	--	2.6	1,224	1,239
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.6	388	388	--	--	--	--	--	--	--	--	--	.6	388	388
26 F.S.	--	--	--	--	--	--	.2	130	186	--	--	--	--	--	--	.7	395	395	--	--	--	--	--	--	--	--	--	.9	831	861
P.	--	--	--	--	--	--	.3	--	365	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.3	--	365
28 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	.6	12	12	--	--	--	--	--	--	--	--	--	--	--	--	.6	12	12
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	166	166	--	--	--	--	--	--	--	--	--	.2	166	166
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tot. F.S.	28.9	4,110	4,138	15.7	705	1,313	5.0	989	1,147	2.3	130	138	2.6	711	736	20.2	8,075	8,075	.9	123	123	--	--	--	--	--	--	83.6	12,843	13,732
Tot. P.	.9	70	70	6.3	706	832	4.5	737	1,444	1.2	15	15	2.1	544	630	8.4	2,032	2,058	.3	6	6	--	--	--	--	--	--	23.7	4,110	5,052

200 - Age Class

8 F.S.	1.5	49	49	2.5	41	41	1.3	30	30	1.9	33	39	--	--	--	.1	2	2	.1	2	2	--	--	--	--	--	--	7.4	157	163
P.	--	--	--	--	--	--	1.2	19	24	.7	14	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9	33	38
10 F.S.	1.6	112	112	4.7	237	241	2.2	113	165	2.6	85	111	.2	8	15	.1	4	4	--	--	--	.1	6	6	.1	6	6	12.0	571	660
P.	--	--	--	.7	33	38	1.2	72	93	1.9	33	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.2	145	178
12 F.S.	1.1	136	142	5.2	252	513	2.2	196	228	2.0	73	123	.2	26	26	.2	23	23	--	--	--	.1	12	12	.1	8	8	11.7	708	1,081
P.	--	--	--	1.2	157	157	2.4	157	193	2.8	117	138	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4	431	488
14 F.S.	1.2	406	406	3.4	239	366	1.2	226	305	1.6	86	154	.1	22	42	--	--	--	--	--	--	.1	20	20	--	--	--	8.6	1,001	1,495
P.	--	--	--	.1	50	95	2.8	243	648	.5	57	57	--	--	--	.2	29	29	--	--	--	--	--	--	--	--	--	3.6	379	829
16 F.S.	.8	255	283	4.1	388	918	.9	137	231	1.6	261	369	1.0	33	33	.2	37	37	.1	30	30	.3	83	83	--	--	--	9.0	1,224	2,064
P.	--	--	--	.3	200	262	3.4	321	655	.2	36	36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.1	557	953
18 F.S.	.8	365	365	4.9	552	1,710	.8	124	435	1.1	103	205	.5	210	216	--	--	--	--	--	--	--	--	--	--	--	--	8.1	1,490	2,919
P.	--	--	--	--	--	--	2.1	110	364	2.1	328	328	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.2	438	1,220
20 F.S.	.1	65	65	3.4	390	1,575	.8	132	134	1.0	123	273	.2	117	117	.1	40	40	.1	56	56	--	--	--	--	--	--	5.2	930	2,220
P.	--	--	--	--	--	--	1.7	126	1,060	.1	29	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.8	155	1,089
22 F.S.	.1	84	84	2.8	395	1,573	.8	55	144	.4	96	130	.3	232	232	--	--	--	--	--	--	--	--	--	--	--	--	3.8	662	2,171
P.	--	--	--	--	--	--	1.4	167	926	1.2	412	412	.2	150	150	--	--	--	--	--	--	--	--	--	--	--	--	2.8	729	1,498
24 F.S.	.2	17	17	2.6	545	1,840	--	--	--	.5	142	214	.5	461	492	.1	67	67	--	--	--	--	--	--	--	--	--	3.9	1,232	2,620
P.	--	--	--	.5	--	310	1.2	107	942	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.7	107	1,452
26 F.S.	.1	11	11	4.1	504	3,454	--	--	--	.5	169	286	.5	556	556	.2	135	135	--	--	--	--	--	--	--	--	--	5.4	1,375	4,442
P.	--	--	--	.5	--	995	.8	--	486	.7	380	380	--	--	--	.2	167	167	--	--	--	--	--	--	--	--	--	1.9	547	1,628
28 F.S.	--	--	--	2.1	141	2,151	--	--	--	.5	120	312	.6	745	745	.4	334	356	--	--	--	--	--	--	--	--	--	3.6	1,340	3,764
P.	--	--	--	--	--	--	.4	333	669	.5	276	276	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.9	609	945
30 F.S.	--	--	--	.6	74	365	--	--	--	.3	204	230	.2	341	341	--	--	--	--	--	--	--	--	--	--	--	--	.1	619	1,136
P.	--	--	--	--	--	--	.8	407	407	.2	173	173	--	--	--	.2	310	310	--	--	--	--	--	--	--	--	--	.6	958	888
32 F.S.	--	--	--	.3	--	475	--	--	--	--	--	--	.1	191	191	--	--	--	--	--	--	--	--	--	--	--	--	.4	191	666
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	334	334	--	--	--	--	--	--	--	--	--	.2	334	334
34 F.S.	--	--	--	--	--	--	--	--	--	--	--	--	.1	178	178	--	--	--	--	--	--	--	--	--	--	--	--	.1	178	178
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
38 F.S.	--	--	--	--	--	--	--	--	--	.2	87	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	87	87
P.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tot. F.S.	8.2	1,500	1,514	40.7	3,838	15,924	10.1	1,052	1,225	14.2	1,884	2,345	4.5	3,126	3,174	1.4	642	664	.3	88	88	.6	121	121	.2	14	14	80.2	11,963	25,469
Tot. P.	--	--	--	4.2	440	1,357	19.9	2,189	7,107	10.9	1,852	1,894	.2	150	150	.8	840	840	--	--	--	--	--	--	--	--	--	36.0	5,478	11,648

F.S. - Forest Service Cut-over Areas.

P. - Private Cut-over Areas.

WASTE ON TYPICAL CEDAR POLE CHANCE

Table No. 5.

Species	Sawlogs Ft. BM Net	Sawlogs Ft. BM De-fect	Cord Wood C.F.	Pulp Wood C.F.	Merch. Poles L.F.	Poles Wasted for Defect L.F.*	Split & Round Posts Pc's **	H'ght Av. Stump Woods Run Ins.	H'ght Av. Sound Stump Ins.	H'ght Av. Defec-tive Stump Ins.	% Stumps Defec-tive	Waste in Stumps Ft. BM	Net Volume Removed: Ft. B.M. 1-*	Total Waste Ft. B.M.	Cubic Feet
W.P.	158	1703	387					10.5	9.2	10.3	49	95	15,800	253	387
W.F.	26	5		36									None	26	36
Hm.		88		12									None	--	12
L.			131					18.5				7	350	7	131
D.F.	83		3				**						None	83	3
Ced.	94	1075			72	552	242	22.6				109	3,370	203	570
All	361	2871	521	48	72	552	242	15.5				211	19,520	572	1139

* Based on tally of 21 1/5-acre plots including pole-long butts and tops cut back because of minor defect not within Ass'n specification limits, or to comply with market demand for short poles.

** An unavoidable loss under present economic conditions.

1-* Cull % landing scale, 18.8%; woods cull, or material left in woods, 10.8%; breakage, 2%; or Total 31.6%.